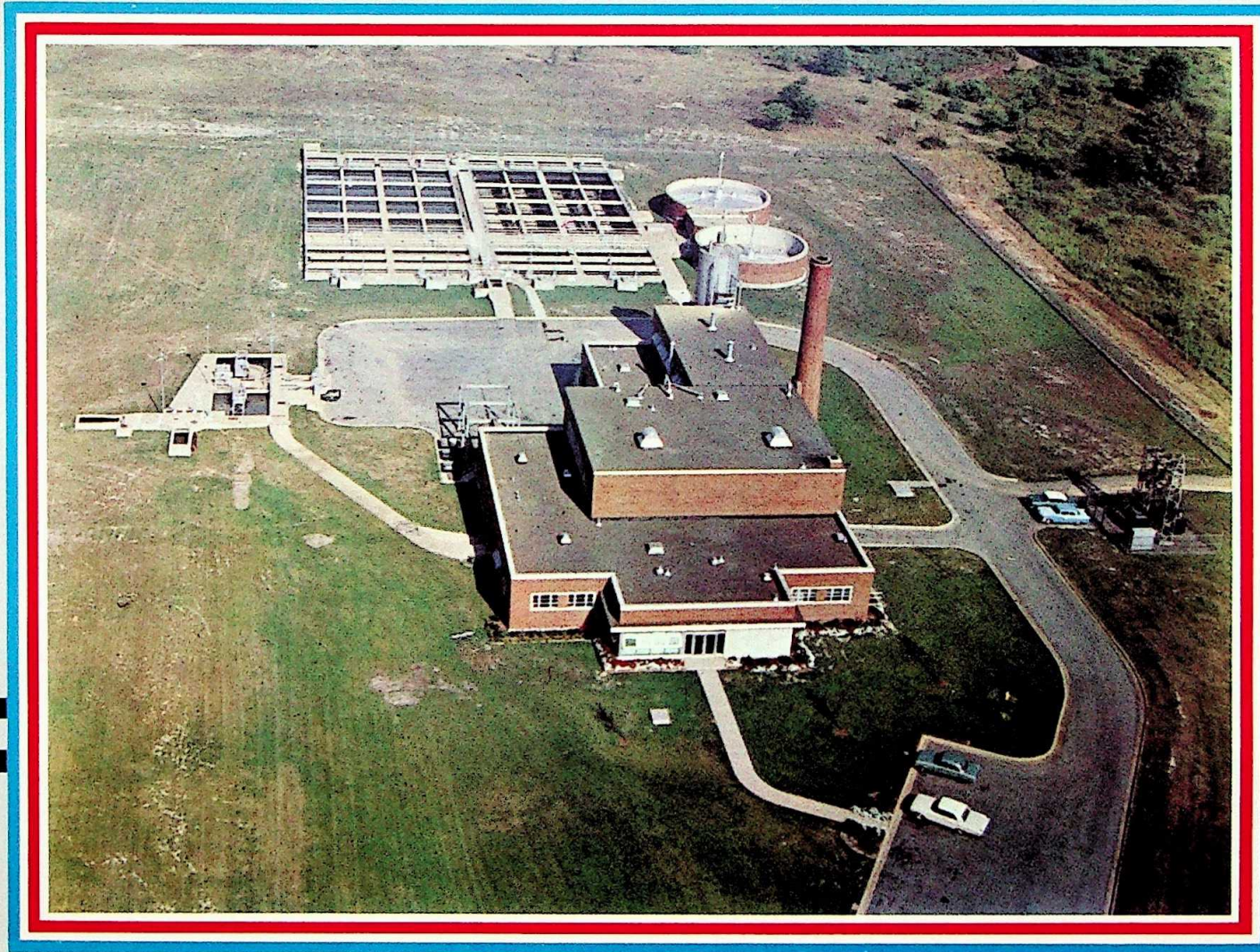


CITY of WARREN

WASTE WATER TREATMENT PLANT



WARREN, OHIO

SEPTEMBER 1962



A Dedication

TO

**THE PEOPLE of WARREN
WASTE WATER TREATMENT
FACILITIES
PLEDGED TO CLEAN STREAMS**

PLANT DESIGN DATA

Description: Primary treatment plant with provisions for chemical treatment. Raw Sludge filtering and incineration. Waste Water pumping station.

Design Average Flow, MGD	13.5
Design Maximum Flow, MGD	32
Design Population Equivalent (1970)	90,000
Design Wastes Characteristics	
Suspended Solids in mg/l	200
Biochemical Oxygen Demand in mg/l	180
Expected Removal of Suspended Solids with chemical treatment, per cent	80
Expected Removal of B.O.D. with chemical treatment, per cent	65
Design, Pumping Station	
4, 16 inch vertical type pumps, capacity each, MGD	9.0
Firm, capacity, total MGD	28.5
Design, Treatment Plant	
Grit Removal, 2 detritors, removal of plus 65 mesh grit, percent	95
Communitors, 25 inch machines, each 10.5 MGD	3
Flocculators and Settling Tanks	
Capacity, cubic feet each,	53,130
Detention time at average flow, hours	2
Chlorine Contact Tank	
Capacity, cubic feet	16,800
Contact time for chlorine, minutes	20
Chlorinators	
Number of machines	3
Capacity per day each, pounds	1,000
Sludge Holding Tanks	
Number of Tanks	2
Capacity each, cubic feet	31,800
Sludge Filters	
Number of filters	2
Filter Area, square feet, each	300
Incinerators	
Number of Furnaces	2
Capacity per day, tons	50
Ash Handling Equipment	
Capacity in pounds per hour	700
Hopper capacity, cubic feet	69
Storage capacity, cubic feet	1100
Chemical Feed Equipment	
Number of pumps	2
Ferric Chloride Pumps, capacity, gal. per hour	93
Lime Feeders and Slakers	
Number of machines	3
Capacity, pounds per hour	300
Chemical Dilution Tanks	2
Chemical Storage Tanks, 12,000 gallon Capacity	3



WARREN

The City of Warren derived its name from Moses Warren, a surveyor who came into this territory in 1796. By 1810, Warren was the largest township in the Western Reserve, with 875 hearty settlers, and was the capital of the Western Reserve area. Its early industries were the customary pioneer activities. The iron industry was started early in Trumbull County and in 1870 a blast furnace was erected in Warren. Coal was discovered and widely used in the Mahoning Valley. This momentum of an early beginning cannot be overlooked in recognizing the position of Warren today in the steel industry.

Its location in the heart of the great Mahoning Valley steel district, midway between Cleveland and Pittsburgh, has played a major part in making it a highly industrialized city. Many other facts, of course, have brought about this development, not the least of which has been its wealth of outstanding industrial citizens, who, over the years, have developed the background of the Warren economy.

Although the city has experienced a steady growth over the years, its most rapid expansion has taken place in the past two decades. Its present population of 61,211 people reflects an increase of more than 43% during that period. If the suburban area immediately surrounding the city limits were included this figure would exceed 80,000. It is significant that 65% of the homes in the city are owner occupied. Trumbull County, of which Warren is the county seat, is the ninth largest in the State of Ohio. Its trading area includes over 25,000 people and the city itself covers a physical area of 10.9 square miles.

Industrially, Warren is very fortunate in having many diversified industries. This has been a stabilizing influence in the community making it less susceptible to business fluctuations. In recent years there have been huge expenditures for plant expansion and modernization by long established firms, totalling more than \$135,000,000, since 1959. These investments in new plant facilities, although not substantially increasing employment, have nevertheless assured a continuing high level of employment.

On the cultural side, Warren has been outstanding. It can indeed be proud of its excellent educational, recreational, and cultural facilities. These include eight city parks, a music hall, municipal swimming pool and golf course. Its school system includes many new modern buildings which have been constructed to keep up with the growing population. Warren's hospitals have also kept pace with the time through expansion and modernization programs generously supported by its citizens.

The many reservoirs in the area provide Warren with an excellent supply of water, totalling 76 billion gallons, with the West Branch Reservoir, now under construction, adding another 25 billion gallons to this supply. Warren is also a city of 49 churches, including all denominations.

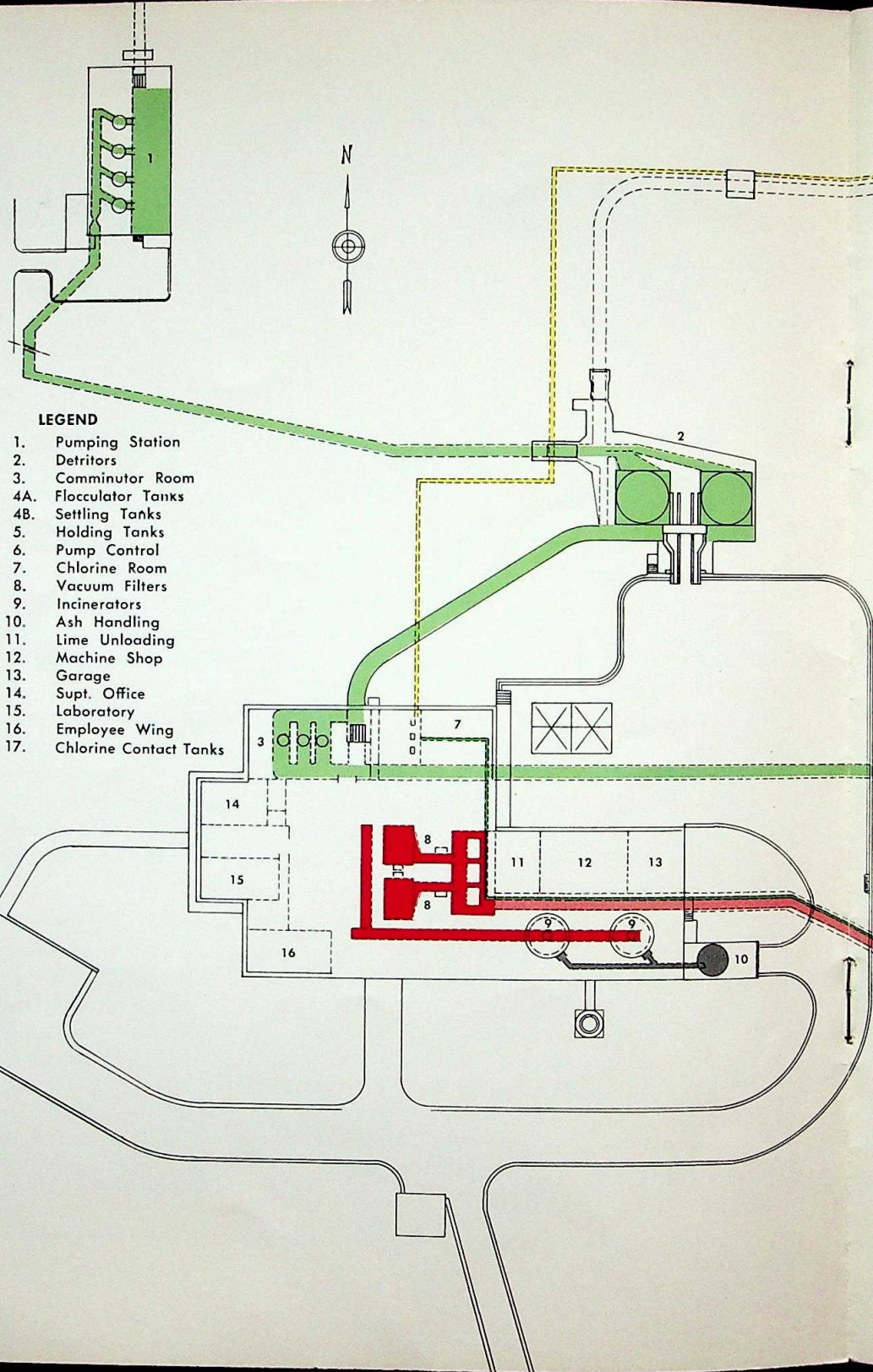
The dedication of the Waste Water Treatment Plant takes formal cognizance of the addition to the City of this modern, attractive, utilitarian facility, and brings recognition to a progressive advancement of which the citizens of Warren, and those involved with the design, construction and operation of the plant can be justly proud.

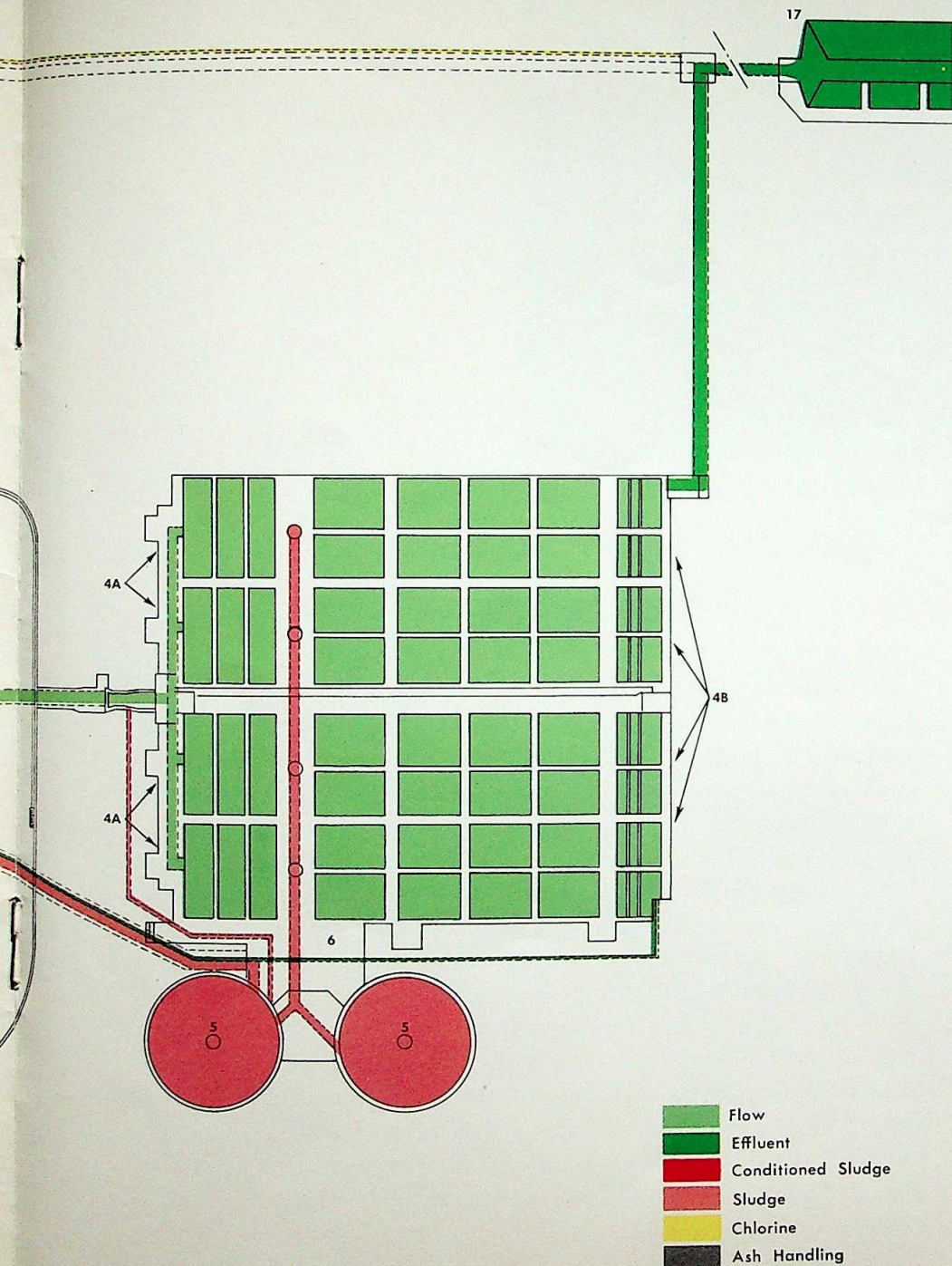
A GUIDE FOR YOUR TOUR!

PUMPING STATION—All raw waste water enters the pumping station through a 84-inch interceptor sewer. It flows into the wet well where the 4, 16 inch centrifugal pumps lift it from and pump it to the treatment plant, 4500 feet south.

DETRITORS — The flow from the pumping station enters these units to begin the treatment process. These detritors or grit chambers remove the coarse grit, stones, and other inorganic materials. It is washed as it is raked into pans for removal to fill.

FLOCCULATORS and SETTLING TANKS — The flow enters these tanks after being comminuted to break down large organic solids. Chemicals can be added ahead of these units to provide a higher degree of treatment. The heavy solids are settled and removed from the flow in these tanks and pumped to the holding tanks until they can be disposed of.





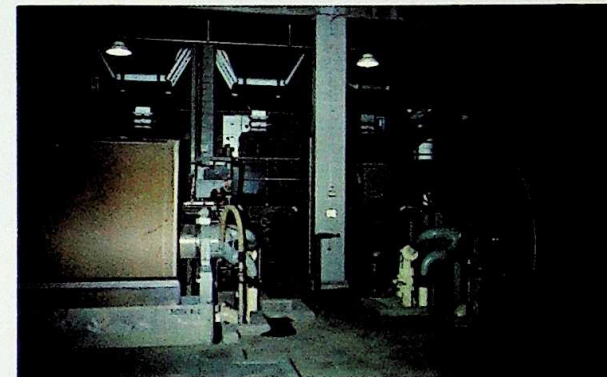
CHLORINE CONTACT TANKS—The flow comes from the settling tanks through a 54 inch pipe to these units. The chlorine solution is added in the pipe. The tanks provide a 20 minute contact time with the waste water before it is discharged into the river. The waste water at this point has had approximately 65 per cent of everything that was in it removed. The solids removal will run as high as 80 per cent.

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VACUUM FILTERS — Raw sludge held in the holding tanks is pumped to the sludge well. Raw sludge is conditioned with Ferric Chloride and Lime and then dewatered. The sludge cake has a moisture content of about 70 per cent. The sludge is discharged from the drum to a conveyor or belt where it is weighed.

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INCINERATORS — The sludge is dumped off the conveyor belt into either or both of the sludge incinerators. These 5 hearth furnaces burn the sludge at approximately 1400° Fahrenheit. The ash that is left after burning is stable and very light. The ash is removed by the ash removal system to a storage hopper and then trucked to the fill.

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LABORATORY — No waste water system in an industrial city such as Warren, could carry out its function without laboratory control. The laboratory is responsible for complex testing of the flow to the treatment plant and monitoring the discharges from industry that are contributed to the river. The laboratory in Warren's plant are the eyes and ears of the program to eliminate pollution in the Mahoning River from Lake Milton to Niles.

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WATER POLLUTION ABATEMENT PROGRAM

The advance of water pollution in the City of Warren and its immediate water courses has been steady since the first sewer was constructed at the turn of the century. With a growth of population and the addition of many diversified industries through these years has brought us to our present position, that of having to provide relief and protection to our water courses in the Warren Metropolitan Area. At one time, the water in the Mahoning River was used as our drinking water. The pollution load being put into the river was one of the factors forcing the construction of our new water treatment plant and finding a source of supply elsewhere. Since 1940, the pollution poured into the Mahoning River by our industries and our own domestic wastes has brought upon us action by the State of Ohio and other regulatory agencies to take steps to abate this pollution. These actions are being enforced for

the public health, and welfare of the people of Warren, and our downstream neighbors.

The construction and operation of modern collection and treatment facilities is the first step toward solving this problem. The Waste Water Treatment facilities being dedicated in September, 1962, provide partial treatment for our domestic wastes and a few industrial wastes. This, along with industry and other contributors of pollution will be making a concentrated drive to restore the Mahoning River to a useful water course again.

The Waste Water Treatment Department of the City of Warren shall become concerned with all water pollution problems, no matter how small they might seem. The Department will be concerned with all industrial discharges being made to the sewer system or water courses and will do everything possible to approach the problem in an intelligent, direct manner to carry on our program of clean streams.

WASTE WATER TREATMENT DEPARTMENT

PLANT CONSTRUCTION AND OPERATION

CITY ADMINISTRATION 1962 - 1963

Robert W. Dunstan, Mayor
Gilbert Menz, Director

Reed Stump -----	City Engineer	C. L. Thompson -----	City Treasurer
Carrie E. Lovett -----	City Auditor	Bruce Birrell -----	City Solicitor

COUNCIL

George A. Job, President
Thalia Tidball, Clerk of Council

Milton Mollenkopf	Jack Hostutler
John Carney	William Maurice
Arthur Richards	Robert Nader
William Watson	Howard Dunmire
Jack Hildum	Joseph Wyndham

WASTE WATER TREATMENT PLANT

William R. Hill, Superintendent
Robert E. Barker, Chemist and Chief Operator
Ralph Lake, Chief Mechanic

CONSULTING ENGINEERS

Havens and Emerson ----- Cleveland, Ohio
Howard G. Brown ----- Resident Engineer

GENERAL CONTRACTORS

Hunkin-Conkey Const. Co. ----- Cleveland, Ohio
Andy Gump ----- Construction Superintendent

Publication of this brochure was made possible through the co-operation of the following firms:

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Sludge Pumps, Communitors

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Reinforcing Steel

Miller-Yount Paving Co.
Roadways and Paving

Rex Chain Belt Company
Sludge Collectors, Flocculators

Beaumont Birch Company
Ash Removal Equipment

Barefoot and Case, Mfgs. Representatives
B. I. F. Ind. and Others

Fuller Co. Dracco Division
Lime Unloading Equipment

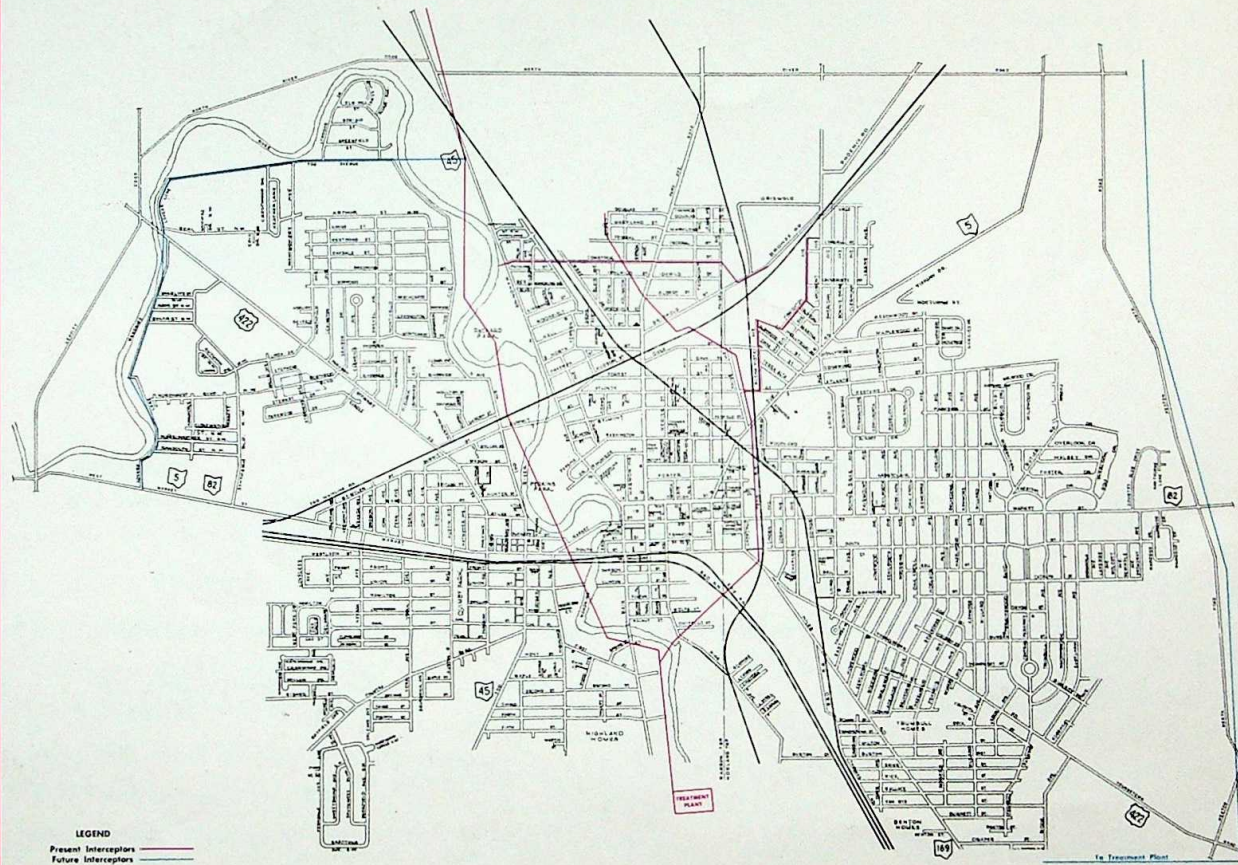
Eimco Corporation
Sludge Filtering Equipment

Robert L. McBane
Aerial Picture on Cover

Nichols Engineering and Research Co.
Sludge Incinerators

Wester Bros. Concrete
Ready Mix Concrete

**MAP OF
INTERCEPTOR
SEWER
SYSTEM
FOR
METROPOLITAN
AREA OF
WARREN
OHIO**



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